

BATTERY POWERED TABLE SAWS

BACKGROUND OF THE INVENTION

Field of the Invention

5 The present invention relates to a battery powered table saw that has a table and a saw unit vertically movably supported on the table.

Description of the Related Art

Known motor driven saws, excluding permanently installed floor models, are
10 generally classified as either portable saws or table saws. Portable saws are generally adapted to rest on and move along a workpiece so as to cut the workpiece. Table saws have a table for placing a workpiece thereon and have a saw unit vertically movably supported on the table, which saw unit can be moved downward toward the workpiece on the table so as to cut the workpiece.

15 Some known portable saws have a battery powered motor. For example, U.S. Design Patent No. 363,656 teaches such a portable saw. However, known table saws are driven by an AC power source and the applicant is not aware of any attempts to produce a battery-driven table saw. For example, U. S. Patent No. 5,782,153 teaches such a table saw that is driven by an AC power source. Thus, known table saws all require that an electric cord

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Preferably, a battery mounting device is utilized to mount the battery on the table saw and the position of the battery mounting device may be advantageously chosen to provide additional useful features. For example, the battery mounting device may be positioned adjacent to a switch for starting the motor, so that wiring between the battery and the switch can be shortened and simplified. Alternatively, the battery mounting device may be positioned such that the battery serves as a counterweight against the weight of the motor or

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FIG. 2 is a side view of a second representative embodiment of a table saw wherein:

10 the saw unit in the lowermost position;

FIG. 4 is a plan view of the third representative embodiment, wherein the saw unit has been omitted;

FIG. 6 is a side view of the fourth representative embodiment of a table saw wherein the saw unit is in the lowermost position;

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FIG. 8 is a side view of a fifth representative embodiment of a table saw wherein the saw unit in the uppermost position;

FIG. 9 is a plan view of the fifth representative embodiment;

FIG. 10 is a side view of a sixth representative embodiment of a table saw wherein
5 the saw unit in the uppermost position; and

FIG. 11 is a plan view of a saw unit of the sixth representative embodiment.

DETAILED DESCRIPTION OF THE INVENTION

Preferably, a table saw includes a table for placing a workpiece thereon. A saw unit
10 may be vertically and movably supported on the table and may have a saw blade mounted thereon. A battery-driven motor may be mounted on the saw unit for rotatably driving the saw blade and a battery mounting device may be provided to mount a battery on the table saw. Using this design, the battery powered table saw can be used in places that are far away from commercial power source outlets and the need for generators is eliminated.

15 In a first representative embodiment, the battery powered table saw has a handle and the battery mounting device is disposed on the handle. Preferably, the battery powered table saw includes a battery case for accommodating the battery, which battery case has an opening formed therein to permit foreign particles that may enter the battery case to be exhausted. The handle may have a switch mounted thereon and may be operable by the operator to start the

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5 supporting the table, and the battery mounting device may be disposed in the base. The table also may be rotatably supported on the base and may have a pair of auxiliary tables that are positioned on both sides of the table in opposed relationship with each other substantially in the diametrical direction of the table. The battery mounting device is preferably disposed in one of the auxiliary tables.

10 The table preferably may be rotated in opposite directions from a reference position within a predetermined angle. The motor may be positioned on one side of the saw unit closer to one of the auxiliary tables when the table is in the reference position. The battery mounting device may be disposed in the other auxiliary table, so that the battery mounted on the battery mounting device can serve as a counterweight to the moment of the motor.

15 The saw unit may be mounted on a peripheral part of the table, so that the saw unit is positioned on one side in forward and rearward directions that is substantially perpendicular to the diameter of the table across the auxiliary tables when the table is in the reference position. In such a case, the battery mounting device on the other of the auxiliary tables is preferably positioned on the other side of the forward and rearward directions, so that the

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be a rechargeable battery that is normally used in power tools. In particular, the battery 20 may be a Ni-Cd rechargeable battery having an output power rating of about 18V. Suitable batteries are manufactured and distributed by the assignee company of this application, Makita Corporation of Aichi-ken, Anjo-shi, Japan, under the product name "BATTERY 1822".

5 A lid 22 may be connected to the battery case 21 by means of a hinge 22a so as to open and close an open end of the battery case 21. The lid 22 may serve to prevent foreign particles from entering the battery case 21.

The battery 20 may have a pair of spring-biased push buttons 20a (one shown in FIG. 1) disposed on both lateral sides thereof. Each of the push buttons 20a may have an
10 engaging claw 20b formed on its outer end. The battery case 21 may have engaging portions formed at the open end for engagement with the corresponding engaging claws 20b. In order to mount the battery 20 within the battery case 21, the operator may hold the battery 20 with the push buttons 20a while manually depressing the push buttons 20a, insert the battery 20 into the battery case 21, and then release the push buttons 20a. As a result, the engaging claws
15 20b automatically engage their corresponding engaging portions of the battery case 21, so that the battery 20 can be fixed in position within the battery case 21. In order to remove the battery 20 from the battery case 21, the operator may depress the push button 20a so as to disengage the engaging claws 20b from the engaging portions of the battery case 21.

The battery case 21 may have positive and negative power source terminals 21b

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drive circuit, can be reliably prevented. Moreover, because foreign particles entering the battery casing 21 may be discharged to the outside from the discharge opening 21a, the interior of the battery casing 21 can be kept free from foreign particles. Naturally, the lid 22 may be opened to discharge the foreign particles through the open end of the battery casing 21.

5 Second to sixth representative embodiments of table saws will now be explained with reference to FIGS. 2 to 10. In these drawings, like members are given the same reference numerals as in FIG. 1. In each of these representative embodiments, the table saw can be used in places, in which outlets are not provided. Thus, highly versatile and useful table saws are taught.

10 A second representative embodiment of a table saw is shown in FIG. 2, in which the DC motor 32 of the table saw 30 is driven by a battery 31 as the power source. In this design, a battery case 34 may be integrally formed with a front portion (left portion as viewed in FIG. 2) of a handle 33 that is operable by an operator for vertical pivotal movement of a saw unit 35. The battery 31 may have a pair of spring-biased push buttons 31a (one shown in FIG. 2) 15 disposed on both lateral sides thereof. Each of the push buttons 31a may have an engaging claw 31b formed on its outer end. Therefore, the battery 31 may be mounted within and removed from the battery case 34 in the same manner as the first representative embodiment. Also, positive and negative power source terminals 34a are mounted on the bottom of the battery case 34 in the same manner as the first representative embodiment.

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Thus, a battery case 41b is mounted within the front portion of the auxiliary table 41a disposed on the lower side as viewed in FIG. 4. A battery 40 may be inserted into and removed from the battery case 41b for charging. As in the first and second representative embodiments, the battery 40 may have a pair of spring-biased push buttons 40a on opposite sides thereof, so that the battery 40 can be removably held in position relative to the battery case 41b.

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30, 45, 50 and 60 of the first to fifth representative embodiments, in which the saw blade 13

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By virtue of the incorporation of the belt 71 that transmits the rotation of the motor 73 to the saw blade 72, the motor 73, the battery 82 and the handle 81 may be arranged substantially in alignment with each other on the plane of the saw blade 72 as shown in FIG. 11. With this arrangement, a weight balance may be achieved between the right and left directions of the saw unit 80. In particular, because the motor 73 may be disposed equally on the right and left sides about the plane of the saw blade 72, the saw unit 80 may be permitted to pivot by substantially the same angle on both the right and left side directions when a cutting operation is performed with the saw blade 72 inclined in the lateral direction relative

74. Therefore, the table saw 70 may be improved in operability also in this respect.

Further, with the arrangement of the battery 82 between the motor 73 and the handle 81, the wiring operation of the motor drive circuit can be easily performed.

5 As a person of skill in the art will readily understand, the second to sixth representative embodiments may be modified in various way without departing from the invention.

For example, the battery cases 34, 41b, 53 and 64 of the second, third, fourth and fifth embodiments, respectively, may have discharge openings for discharging foreign particles or may have lids for preventing foreign particles from entering the battery cases.

In addition, although the present invention has been described in connection with two different types of table saws, one type of the first to fifth representative embodiments, and the other type of the sixth representative embodiment, the present invention may be applied to any kinds of table saws.

15 Further, the battery case or battery may be disposed at any position and is not limited to the locations disclosed in the representative embodiments. For example, the battery case may be disposed below the base of the table.

Furthermore, although the batteries in the above representative embodiments may be removed from the battery cases for the purpose of the charging operation or may be

discarded for replacement with a new charged battery, the batteries may be fixedly mounted to the battery cases. However, in such a case, the operator may be require to move the table to a position where an electrical outlet is available in order to perform the recharging operation.